

Percentages of indications verified, January, 1888.

States.		States.	
Maine.....	73.84	Kentucky.....	69.94
New Hampshire.....	74.19	Ohio.....	69.39
Vermont.....	70.10	West Virginia.....	68.10
Massachusetts.....	69.97	Indiana.....	70.61
Rhode Island.....	69.84	Illinois.....	71.97
Connecticut.....	67.32	Lower Michigan.....	71.19
Eastern New York.....	69.52	Upper Michigan.....	72.42
Western New York.....	65.03	Wisconsin.....	69.90
Eastern Pennsylvania.....	74.29	Minnesota.....	72.87
Western Pennsylvania.....	65.52	Iowa.....	75.45
New Jersey.....	73.55	Kansas.....	79.35
Delaware.....	73.32	Nebraska.....	78.26
Maryland.....	75.12	Missouri.....	73.84
District of Columbia.....	74.00	Colorado.....	75.00
Virginia.....	72.55	Eastern and central Dakota.....	72.61
North Carolina.....	73.39	Southern California.....	81.22
South Carolina.....	74.58	Northern California.....	77.32
Georgia.....	71.03	Oregon.....	75.87
Eastern Florida.....	77.00	Washington Territory.....	79.10
Western Florida.....	71.03	By elements:	
Alabama.....	71.68	Weather.....	74.15
Mississippi.....	74.58	Wind.....	75.36
Louisiana.....	74.48	Temperature.....	69.03
Texas.....	73.23		
Arkansas.....	73.55	General average.....	72.22
Tennessee.....	68.65		

* In determining the general average percentage and the percentages for the different elements, Minnesota, eastern and central Dakota, and Pacific coast states have not been included.

LOCAL VERIFICATIONS.

The following is from the report of the "Michigan State Weather Service" for January, 1888:

Weather and temperature signals are now displayed in one hundred and forty-three towns in the state, and on the baggage-cars of twenty-six trains on eight principal railroads of the state.

The indications and cold-warnings are issued by the Chief Signal Officer and distributed to the different stations through the central office. The indications

are issued at 1 a. m., daily, from the Chief Signal Office, Washington, and are for the twenty-four hours from 7 a. m. to 7 a. m.

The percentage of verification of these indications for January is as follows (the verification is taken from reports of displaymen furnished this office monthly): temperature, 78.8 per cent.; weather, 83.5 per cent.; temperature and weather, 80.9 per cent.

The percentage of verification of weather predictions for January on the D., G. H., and M. R'y., is 80.0 for weather, and 74.3 for temperature; on the C. & G. T. R'y., weather, 80.7, and temperature, 76.0; P. H. & N. W. R'y., weather, 85.0, and temperature, 79.7; M. C. R'y., for weather, 86.2, and for temperature, 83.7; G. R. & I. R'y., weather, 81.3, and temperature, 81.3; C. & W. M. R'y., weather, 90.0, and temperature, 77.7; P. O. & P. A. R'y., weather, 80.0, and temperature, 79.0.

Cold-wave signals were ordered by the Chief Signal Officer on the 1st, and were verified on the 2d; on the 6th and continued until 7 a. m. of the 8th, and were justified by average fall of 26° in temperature; on the 18th and continued until 8 p. m. of the 14th; on the 15th at 7 a. m. and continued until 7 a. m. of the 16th; on the 19th at 6.30 p. m. and continued until 7 a. m. of the 21st; on the 25th at 6.15 p. m. and continued until 7 a. m. of the 28th. The temperature fell from 15° to 25° in the time specified by the warnings.

Many favorable comments were made on the benefits derived.

The following is from the January, 1888, report of the "South Carolina Weather Service":

The percentage of verification of the weather and temperature predictions for the whole state was: for weather, 71.5; for temperature, 74.7.

The following is from the "Tennessee State Board of Health Bulletin" for January, 1888:

There were six cold-wave predictions—that of the 4th being partly verified, failing in the western division, also that of the 18th being only partly verified, failing in some portions of the middle division, and those of the 6th and 18th being twenty-four to forty-eight hours later than the predictions indicated. The others were generally fully verified.

The percentage of verification of weather and temperature predictions, furnished daily from the Signal Office at Washington to the various stations in the state during the month was, for the state: weather, 64.8 per cent., and temperature, 67.2 per cent.

STATE WEATHER SERVICES.

The following extracts are republished from reports for January, 1888, of the directors of the various state weather services:

The "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

The temperature was about normal.

Although there were rainy days during the month, still the precipitation was only 0.78 of an inch above the normal. The season was quite unpleasant on account of the constant dampness of the atmosphere.

In this section of the United States January is generally a disagreeable month, both on account of the degree of cold and also the frequency of rains, so that the past month has only been exceptionable because of the small number of really cold days it contained.

There were three cold waves predicted, viz., on the 7th, 14th, and 15th; that of the 15th was the only one verified.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.30; maximum observed, 30.69, at Auburn, on the 19th; minimum observed, 29.79, at Montgomery, on the 1st; range for state, 0.90.

Temperature (in degrees Fahr.).—Monthly mean, 46.4; highest monthly mean, 51.1, at Montgomery; lowest monthly mean, 39° 3', at New Market; maximum, 78°, at Newton, on 6th; minimum, 10, at Gadsden, on the 19th; range for state, 68; greatest local monthly range, 62, at Gadsden; least local monthly range, 48, at Selma.

Precipitation, including melted snow (in inches).—Average for the state, 4.74; greatest, 11.50, at Selma; least, 0.54, at Bermuda.

Wind.—Prevailing direction, northwest.

The "Monthly Review of the Illinois Weather Service," Col. Charles F. Mills, Springfield, director:

The meteorological features of January presented some rather unusual characteristics, the principal of which were high barometer, low temperature, and some remarkably sudden changes.

The mean temperature of the month was 5° 8' below the normal of the past ten years; the difference being greatest in the northern and least in the southern division, 6° 4' in the former and 4° 4' in the latter. The 15th and 16th were the two coldest days. The most remarkable feature, however, was the great range of the 13th, when the thermometer fell from 50° to 55° in the northern and western parts of the state, and from 35° to 45° in the southern. This was the greatest, as well as the most sudden, fall ever recorded in the state. On twenty-three days during the month the temperature was reported below zero, and the lowest point reached was 30° below. The precipitation was 0.24 inch above the average of the past ten years, dis-

tributed as follows: 0.32 inch below in the northern division, 1.50 inches above in the central, and 0.38 inch below in the southern. Except in the northern portion of the state the greater portion of precipitation was in the form of rain and sleet; the snowfall was below the average. The greatest precipitation occurred on the 6th, 12th, and 14th.

The "Indiana Weather Service," Prof. H. A. Huston, of Purdue University, Lafayette, director:

The mean barometric pressure over Indiana during January, 1888, was 0.145 inch above normal; the highest pressure occurred on the 16th, when the barometer at many places rose to the unusual height of over 31 inches; the lowest, 29.71, occurred on the 1st. Barometric changes were very abrupt and frequent, especially so on the 1st, 4th, 6th, 13th, and 30th. On the 13th the barometer, in fifteen hours, fell from about 30.5 to 29.9 inches, and rose equally as fast to 30.5 again, and continued to rise steadily until it reached its greatest height on the 16th.

The month was uniformly cold. The mean temperature was slightly below the normal, and the daily mean temperature was only above the normal from the 4th to 7th and 29th to 31st; nevertheless the reading of the thermometers was not as low as during January, 1887, especially so in the central and southern parts of the state.

The precipitation during January was generally slightly above normal, the most frequent falls occurred during the first half of the month. On the 16th sleet fell at many places from 3 to 6 inches deep; being preceded by rain and followed by snow and a temperature below zero, a solid cover of ice formed which lasted for many days. The snowfall in the central and southern parts, was slight, but in the northern part it reached a depth of fifteen inches.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.289; maximum observed, 31.071, at Lafayette, on the 16th; minimum, 29.710, at Worthington and Indianapolis, on the 1st; range for state, 1.361; greatest local range, 1.230, at Indianapolis; least local range, 0.999, at Mount Vernon.

Temperature (in degrees Fahr.).—Monthly mean, 28.2; highest monthly mean, 32.3, at Marengo; lowest monthly mean, 16.0, at La Grange; maximum, 67.0, at Degonia Springs, on the 6th; minimum, —16.0, at Logansport, on the 16th; range for state, 61.5; greatest local monthly range, 78.0, at Logansport; least local monthly range, 52.0, at Angola.

Precipitation, including melted snow (in inches).—Average for the state, 3.08; greatest, 5.83, at Huntington; least, 1.18, at Bloomington.

Wind.—Prevailing direction, northwest.

The "Kansas Weather Service," Prof. J. T. Lovewell, Topeka, director:

The temperature has been below the January average. The month opened with a warm wave; the temperature then declined until it culminated in the severe cold wave of the 14-15th; it remained low during the succeeding week and was followed by a cold wave on the 20th and 21st, after which it rose, the highest for the month occurring from the 28th to the 31st. The local ranges in temperature were unusually large; the mean monthly range for the middle division, 86°, and for the western division, 90°.

The precipitation is below the January normal, the average for the state being 0.56 of an inch; it was unevenly distributed, as follows: 60.3 per cent. fell in the eastern division, 35.2 per cent. in the middle division, while but 4.5 per cent. fell in the western division; again, in the eastern division the greater portion fell during the storm of the 5-7th, while in the middle and western divisions it fell on the 12th.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 19.4; highest monthly mean, 27, at Sedan; lowest monthly mean, 15, at Gibson and Cawker City; maximum, 73, at Collyer, on the 28th; minimum, -32, at Cawker City, on the 15th; range for state, 105; greatest local monthly range, 95°, at Eustis; least local monthly range, 72, at Lawrence; greatest daily range, 48, at Gibson, on the 10th; least daily range, 1, on the 14th, at Rome.

Precipitation, including melted snow (in inches).—Average for the state, 0.56; greatest, 1.40, at Grenola; least, 0.03, at Ellis.

Wind.—Prevailing direction, north.

The "Louisiana State Weather Service," in charge of R. E. Kerkam, Sergeant, Signal Corps, at New Orleans:

The mean temperature of the state for the month, 50°, was 1° above the January normal of the past seventeen years. The mean of the northern section was slightly below, and of the southern section was slightly above, their respective January normal temperatures. The mean daily range of temperature for the state was 16°.4; for the northern section, 16°.6, and for the southern section, 16°.3. The greatest daily range of temperature, 47°.8, was reported from Madison Parish on the 15th, and the least, 1°.8, from Caddo Parish on the 9th. The greatest mean daily range reported was 21°.9 from Concordia Parish, and the least was 11°.5 from Ouachita Parish.

The precipitation for the month was comparatively light and evenly distributed between the 5th and 25th. A heavy rainfall of 2.38 inches was reported from Monroe on the 13th, but was the exception; although moderately heavy daily rainfalls, ranging from 0.62 of an inch to 1.64 inches were reported from elsewhere in the state on the 8th, 9th, 12th, 13th, 24th, and 25th. The average precipitation for the state, 3.17 inches, was 2.43 inches below the January normal of the past eighteen years. The deficiency in the average precipitation ranged from 1.9 inches for the northern section to 2.8 inches for the southern section. An average of 1.3 inches (unmelted) of snow and sleet fell in the northern section on the 15-16th, being particularly heavy at Coushatta, from which place a fall of 7.8 inches was reported.

The prevailing direction of the wind was from the north, and its average velocity nearly seven miles per hour. The highest velocities, ranging from twenty-five to thirty miles per hour, occurred on the 15th and 18th.

Summary.

Temperature (in degrees Fahrenheit).—Monthly mean, 50.1; highest monthly mean, 59.8, at Port Eads; lowest monthly mean, 43.2, at Delta; maximum, 88, at New Iberia, on the 13th; minimum, 15, at Shreveport, on the 15th, and Coushatta, on the 19th; range for state, 67; greatest local monthly range, 61, at Farmersville; least local monthly range, 41, at Port Eads; greatest daily range, 47.8, at Vicksburg, Miss., on the 15th; least daily range, 1.8, at Shreveport, on the 9th.

Precipitation, including melted snow (in inches).—Average for the state, 3.17; greatest, 5.84, at Monroe; least, 1.95, at Morgan City.

The "Michigan Weather Service," N. B. Conger, Sergeant, Signal Corps, Lansing, director:

The mean temperature for January, 14°.8, is 5°.9 below the normal of thirteen years. The temperature was below the normal in all sections during January; the greatest deviation, 6°.8, was for the Upper Peninsula, and the least was 4°.6 below the normal in the northern section. The mean daily temperature was below the normal on twenty-four days and above on seven. The highest mean daily temperature, 32°, occurred on the 6th, when the temperature was 9° above the normal, and the lowest, 5° below zero, occurred on the 21st, when the temperature was 22° below the normal. The highest mean daily temperature for the past thirteen years occurred on the 1st, 1876, temperature 56°, and the lowest, 8° below zero, occurred on the 22d, 1883. The highest mean monthly temperature, 33°.7, occurred in 1880, and the lowest, 14°.5, occurred in 1881. The temperature this month is but 0°.3 above the coldest January in the past thirteen years. The maximum temperature, 46°, occurred at Coldwater, on the 6th, and lowest, 36° below zero, occurred at Sault Ste. Marie, on the 21st. Eighteen stations reported minimum temperatures of 20°, or more, below zero on the 21st. Seven cold waves passed over the state during the month, which caused a fall in temperature of from 15° to 30°; that of the 21st was the most severe, and would have undoubtedly caused much more damage if the Chief Signal Officer had not issued a timely warning, which was distributed from this office throughout the state. The mean of the maximum temperatures for the month was 22°.2, and of the minimum 6°.6. The mean range of temperature was 52°.2; absolute range, 82°.

The average amount of precipitation for January, 2.27 inches, is 0.14 above the normal of thirteen years. There was an excess of 0.19 in the Upper Peninsula, and 0.24 in the southern section, while there was a deficiency of 0.14 in the central section, and 0.47 in the northern section. The largest monthly precipitation in the past thirteen years for January, 3.01 inches, occurred in 1886, and the least, 1.27 inches, occurred in 1879. Rain fell on the evening of the 5th and on the 6th. The rainfall was heavy throughout the southern and central parts of the state on the early morning of the 6th, and froze as it fell, in many cases half an inch thick. Light rain fell during the early morning of the 7th, and was followed by snow in the afternoon. General snows fell on the 10th, 12th to 15th, 17th to 19th, 23d, 25th to 27th, while in some localities, especially in the northern portion of the state, precipitation was recorded on all days of the month except the 29th and 30th. The average amount of snow on the ground at the end of the month was 16 inches, while the total amount at individual stations varied from 6 inches in the central section to 54 inches in Upper Peninsula. The average amount of unmelted snow for the month was 21 inches. The average number of days on which 0.01 of an inch, or more, of precipitation fell in the several sections is as follows: Upper Peninsula, 18.8; northern section, 14.9; central section, 11.4; southern section, 11.1; for the state, 2.6.

The "Mississippi Weather Service," Prof. R. B. Fulton, of the University of Mississippi, Oxford, director:

The mean temperature for the month, 45°, is 1° in excess of the mean for January, 1887, and is very nearly the normal. The maximum temperature occurred on the 6th and 7th, and the minimum on the 15th, 16th, and 19th.

The average amount of rainfall for the state this month was 4.01 inches, which is 0.23 inch in excess of the average for January of last year.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 45; highest monthly mean, 53, at Biloxi; lowest monthly mean, 38, at Memphis; maximum, 78, at Vicksburg and Artonish Plantation, on the 5th and 6th; minimum, 6, at Memphis, on the 16th; range for state, 72; greatest local monthly range, 69, at West Point; least local monthly range, 44, at Biloxi; greatest daily range, 48, at Vicksburg; least daily range, 2, at Lamar.

Precipitation, including melted snow (in inches).—Average for the state, 4.01; greatest, 6.48, at Starkville; least, 1.13, at West Point.

The "Missouri Weather Service," Prof. Francis E. Nipher, of Washington University, Saint Louis, director:

The average temperature for January throughout the state was 21°.5; the highest reported was 74°, at Pro Tem, on the 4th, and the lowest, -32°, at Maryville, on the 15th. The average of maximum temperatures was 60°.6, and the average of minimum temperatures, -14°.9; an average range of 75°.5.

The average precipitation for January was 1.99 inches. It was fairly distributed over the state. The greatest amount of precipitation reported was 3.34 inches at Carthage, and the least was 0.60 inch at Ozark.

From the 7th to the 11th, and from the 12th to the 22d, severe cold waves extended over the state, the former reducing the temperature at most stations below zero, and the latter, which was one of the longest on record, reducing the temperature at all stations below the zero point. A third cold wave swept over the northern part of the state from the 24th to the 26th, but it was not severe. The first cold wave was preceded by rain, which changed to a heavy fall of sleet as the air became colder. Rain preceded, and snow and sleet accompanied, the second cold wave.

The "New Jersey Weather Service," Prof. George H. Cook, of the Agricultural College, New Brunswick, director:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 25.4; highest monthly mean, 29.2, at Ocean City; lowest monthly mean, 21.0, at Hanover; maximum, 59.0, at Freehold, on the 2d and 15th; minimum, -12, at Tenafly, on the 23d; range for state, 71.0; greatest local monthly range, 67.0, at Tenafly; least local monthly range, 46.6, at Locktown; greatest daily range, 41.0, at Freehold, on the 16th; least, 2.0, on the 3d, at Paterson and Oceanic.

Precipitation, including melted snow (in inches).—Average for the state, 4.77; greatest, 6.74, at Paterson; least, 2.80, at Salem.

Wind.—Prevailing direction, northwest.

The "North Carolina Weather Service," Dr. Herbert Battle, of Raleigh, director:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 41.4; highest monthly mean, 46.4, at Southport; lowest monthly mean, 35.6, at Lynchburg, Va.; maximum, 75.2, at Raleigh, on the 8th; minimum, 6.9, at Asheville; range for the state, 69.2; greatest local monthly range, 63.0, at Asheville; least local monthly range, 45.2, at Southport.

Precipitation, including melted snow (in inches).—Average for the state, 4.14; greatest, 6.79, at Chattanooga, Tenn.; least, 0.94, at Asheville.

Wind.—Prevailing direction, southwest.

The "Ohio Meteorological Bureau," Prof. B. F. Thomas, of the Ohio State University, Columbus, president:

The mean atmospheric pressure, 30.247 inches, is 0.109 inch above the average for the past five years, and is the highest on record for the month. The highest barometer, 30.993 inches, at Wauseon on the 6th, is not only the high-

est for January, but is the highest on record since the opening of the bureau. The lowest reading 29.423 inches, occurred at Oberlin, on the 1st.

The mean temperature of the air for the month, 23°.0, is but 3° below the five-year average. The highest temperature, 67°.5, occurred at Portsmouth on the 6th, and the lowest, 14°.0 below zero, at Wauseon, on the 28th. The monthly range of temperature was 81°.5, and the mean daily range, 16°.6. The greatest daily range, 39°.1, occurred at Wauseon, on the 12th, and the least, 1°.2, at Youngstown, on the 16th.

Precipitation was general throughout the state on the 1st, 5th to 9th, 12th, 13th, 15th, 17th, 25th, and 26th. Local rains or snows occurred in the northern and middle sections on the 2d, 3d, 4th, 10th, 18th, 29th, and 31st, and in southern section on the 21st and 31st. Sleet was reported from scattering stations in all sections on the 12th, 13th, 15th, and 17th. The mean monthly rainfall, 3.68 inches, is 0.70 inch above the average for the past five years. The average daily rainfall, 0.119 inch, is 0.028 inch above the mean for the month. The greatest monthly rainfall, 6.15 inches, occurred at North Lewisburg; the least, 1.92 inches, at Youngstown. The greatest daily rainfall was 2.06, at Quaker City, on the 6th.

"Oregon Weather Service," report prepared by B. S. Pague, Sergeant, Signal Corps:

Reports were received from thirteen stations, covering the Columbia River basin, the interior valleys, coast, and southern region.

Temperature (in degrees Fahr.).—The marked characteristic of the month was the extreme low temperature. From the 2d to the 21st the temperature was generally below the normal. The coldest weather ever experienced in Oregon occurred on the 14th, 15th, and 16th. Except at the coast stations, and at Albany, the temperature was from -2 at Portland, to -34 at La Grande. Linkville and Lakeview report -24, Eola -6, Roseburg -6, and Ashland -8. The mean temperature was from 5 to 12.6 below the normal at all stations. The central coast stations report the highest mean temperature, and Roseburg reports the highest mean temperature, 35, in the interior valleys; La Grande reports the lowest mean temperature, 17. On the 22d the "chinook" wind began blowing and the temperature rose rapidly in all sections; owing to the influence of this wind, the mean temperature was raised much higher than it otherwise would have been. The maximum temperature occurred from the 25th to 31st. Roseburg reports the maximum temperature, 71. The minimum temperatures reported from the coast stations are, Astoria, 10; Newport, 0.8; Bandon, 14. The extreme cold weather of the 14th, 15th, and 16th appeared in the shape of a regular cold wave, preceded in sections by snow, and then followed by the rapid fall of the mercury. The cold wave was experienced on the entire coast, causing lower temperatures than had ever before been observed. A temperature of zero in the interior valleys of Oregon has never before been observed. The mean temperature of the state is 29.

Precipitation (in inches).—The precipitation was above the normal in all districts, the excess ranging from 0.17 at Roseburg to 5.34 at Eola. For the season, from July 1, 1887, to February 1, 1888, the precipitation is from 0.42 to 4.64 below the normal, except at Astoria and Albany, where it is above the normal. On the 28th, 29th, and 30th excessive precipitation occurred along the coast and in the Willamette Valley; on the 2d and 3d excessive precipitation occurred at Roseburg and in the southern region. Precipitation occurred on from nine to twenty days throughout the state.

The "Pennsylvania State Weather Service," report prepared under the direction of the Franklin Institute, Philadelphia, by Sergeant T. F. Townsend, Signal Corps:

The characteristics of January, 1888, were the distinctive thermal periods of abnormal warmth and cold, dividing the month into two equal parts.

The mean daily temperatures, as compared with those deduced from the records of fifteen years, show a daily excess of about 5° during the first half of the month, and a daily deficiency of about 10° during the last half. At the end of the month there was a total deficiency amounting to 49° at Pittsburg, 106° at Philadelphia, and 179° at Erie. The mean for the month was 22°.1, which is probably 6° below the normal; the highest occurred on the 1st and 7th, and ranged from 61° at Pittsburg to 40°.5 at Carlisle; the lowest were on the 22d and 23d, and the following noted: Dyberry, -19°; Wellsborough, -16°; Columbus, -15°; Eagles Mere, -14°; Greenville, -14°; and Clarion, -18°.5; the mean maxima for the month was 30°.2, and the mean minima 16°.8; these show a daily mean of 23°.2, which is 1°.1 above that obtained from the tri-daily observations at 7 a. m., 2 p. m., and 9 p. m.

The precipitation for the month amounted to an average of 4.19 inches,

which is nearly one inch in excess of the monthly average. Of this amount (4.19 inches) 1.40 inches was melted snow and hail. The rain and snowfall was very unevenly distributed, and ranged from 6.75 inches at Indiana, 6.17 inches at Pittsburg, 6.04 inches at Huntingdon to 2.12 inches at Chambersburg. Excepting the 14th and 22d rain or snow fell in measurable quantities on every day in some part of the state; the greatest amount, and the most rainy days, occurred in the western portion. Most of the storms were mixtures of rain, snow, and sleet.

The "South Carolina Weather Service," Hon. A. P. Butler, Com'r of Agriculture for South Carolina, Columbia, director:

The month has been unusually warm, the temperature being above the average for the month. The mean temperature for the state, 46°.2, is 6°.1 higher than for January, 1887. No general storm has moved directly over the state, although an area of low barometer appeared over Alabama and the Gulf on the morning of the 1st. The greatest amount of precipitation occurred on that day, the average for the state being over 1.25 inches. The average rainfall for the month (2.94 inches) is slightly higher than for same month last year; also number of days on which rain fell. The greatest amount of precipitation occurred in the middle counties.

Summary.

Temperature (in degrees Fahrenheit).—Monthly mean, 46.2; highest monthly mean, 52.5, at Hardeeville; lowest monthly mean, 43.2, at Brewer Mines; maximum, 76, at Charleston, on the 31st; minimum, 15, at Cheraw and Brewer Mines, on the 19th; range for state, 61; greatest local monthly range, 60, at Cheraw and Brewer Mines; least local monthly range, 49, at Newberry; greatest daily range, 34, at Hardeeville, on the 28th; least daily range, 2, on the 23d, at Winnsborough.

Precipitation, including melted snow (in inches).—Average for state, 2.94; greatest, 6.52, at Abbeville; least, 1.21, at Marion.

Wind.—Prevailing direction, northwest.

The following is an extract from the report of the "Meteorological Department of the State (Tennessee) Board of Health," prepared under direction of J. D. Plunket, M. D., President of the State Board of Health, by H. C. Bate, Signal Corps, Assistant, Nashville:

The month of January was marked by no special features except the remarkable sleet of the 15-16th, which remained on the ground for ten days in most parts of the state. There were no very high winds reported except at Greenville, and only one thunder-storm, which was confined to the western division. The percentage of cloudiness was large, and while the temperature was always above zero, the month was generally a very disagreeable one.

The mean temperature was 37°.8, about 4° above the normal for the past five years. The highest temperature was 74°, recorded on the 6th and 7th, and was the highest January maximum since 1884, when it was the same, the lowest during the period being 61°, in 1886. The lowest temperature was 2°, recorded on the 16th and 19th, and was the highest January minimum recorded in the past five years, the next being -2°, in January of last year. The lowest minimum during the period was -28°, reported at Sunbright, January 11, 1886. On that day and the day following the temperature was reported from -14° to -20° at several stations throughout the state. The mean minimum temperature for the month of that year was -10°.74. The ranges of temperature were generally less than usual, but in one instance—at Nashville, on the 15th—the daily range was 45°, a very unusual range.

The mean precipitation for the month was 4.47 inches, about one inch less than the January average of the past four years, and the least during that period. Of this amount the eastern division received an average of 4.76 inches, the middle division 4.20 inches, and the western division 4.45 inches. Much of this precipitation was sleet and snow, especially that portion which fell on the 15th to 20th. The days of the greatest precipitation were the 8th, 9th, 12th, 15th, 16th, and 17th, that on the last-named date being confined mostly to the eastern division. The greatest daily precipitation occurred on the 12th, and the greatest daily local precipitation was 2.18 inches, reported on the 1st at Chattanooga. There were seven days reported without measurable rainfall, viz., 2d, 3d, 19th, 24th, 26th, 27th, and 28th. The greatest monthly precipitation was 7.16 inches reported at Cookeville, and the least, was 2.40 inches, reported at Sunbright, about fifty miles east from the former station. The mean depth of snowfall was 2.79 inches. Frost was reported at various stations on twenty-seven days—the 5th, 6th, 30th, and 31st being the only days reported free from frost.

NOTES AND EXTRACTS.

CHINOOK WINDS.

[By Junior Prof. H. A. HAZEN.]

The term "Chinook" was originally applied to a south or southwesterly wind blowing over Washington Territory and British America from the region formerly inhabited by the Chinook Indians on the banks of the lower Columbia River. The name is now applied to any rather strong southwesterly to northerly wind which is warm and dry blowing to the east of the Rocky Mountains. Its lower limit, roughly speaking, is at the forty-fourth parallel, and it may extend eastward to Dakota. Its principal characteristic is the

power of melting or almost drying up the snow, as frequently no water runs from it. One of the first published notices of it to be found is in the volume of the Canadian Geological Survey, 1879-80, page 77, by Mr. G. M. Dawson. The following are some of the more recent notes regarding it: "Science," August 29, 1884, page 166; December 25, 1885, page 556; January 8, 1886, page 88; January 15, 1886, page 65; "American Meteorological Journal," May, 1885, page 18; November, 1886, page 330; December, 1886, page 342; February, 1887, page 467; March, 1887, pages 507 and 516; August, 1887, page 182; September, 1887, page 224.

The following are some extracts from the above writings: Mr. Ingersoll